ABSTRACT

Methods and apparatuses for still image compression, video compression and automatic target recognition are disclosed. The method of still image compression uses isomorphic singular manifold projection whereby surfaces of objects having singular manifold representations are represented by best match canonical polynomials to arrive at a model representation. The model representation is compared with the original representation to arrive at a difference. If the difference exceeds a predetermined threshold, the difference data are saved and compressed using standard lossy compression. The coefficients from the best match polynomial together with the difference data, if any, are then compressed using lossless compression. The method of motion estimation for enhanced video compression sends I frames on an "as-needed" basis, based on comparing the error between segments of a current frame and a predicted frame. If the error exceeds a predetermined threshold, which can be based on program content, the next frame sent will be an I frame. The method of automatic target recognition (ATR) including tracking, zooming, and image enhancement, uses isomorphic singular manifold projection to separate texture and sculpture portions of an image. Soft ATR is then used on the sculptured portion and hard ATR is used on the texture portion.

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